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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,256	09/08/2003	Anbo Wang	3811-007-27	8598

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DLA PIPER US LLP  
ATTN: PATENT GROUP  
1200 NINETEENTH STREET, NW  
WASHINGTON, DC 20036

EXAMINER
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KIANNI, KAVEH C

ART UNIT	PAPER NUMBER
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2883

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/03/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/656,256

Applicant(s)

WANG, ANBO

Examiner

Kianni C. Kaveh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 25-30, 32, 33, 36 and 39-43 is/are pending in the application.
- 4a) Of the above claim(s) 32, 33, 36 and 39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 25-31 and 40 is/are rejected.
- 7) ☒ Claim(s) 41-43 is/are objected to.
- 8) ☒ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Allowable Subject Matter***

Claims 41-43 are objected to as being dependent upon a rejected base claim, but would be allowable if non longer their respective base claims are no longer are rejected under 35 USC 112, 2<sup>nd</sup> Parag., and rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 41 and 42 allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious optical sensors formed therein, the pulse having a duration less than a time required to travel a smallest distance between the two most closely spaced sensors; and wherein the Fabry-Perot cavities are designed such that a cavity length varies only over a quasi-linear range of a half fringe under conditions to which the Fabry-Perot cavities are exposed, respectively, in combination with the rest of the limitations of the base claim.

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly

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owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 25-31 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cielo (US 4400056).

Regarding claim 25 and 40, Cielo teaches a method comprising the steps of: forming a mask /plurality-of-masks 16 over an optical fiber 10, the optical fiber having a core 12 surrounded by a cladding 14, the mask/each-mask 16 having openings 26, the openings of the plurality of masks 16 being spaced a part; exposing the opening/each-of-the-openings 26 to light/radiation propagation outside the optical fiber (shown in fig. 1, item 28) such that a refractive index of a portion of the fiber corresponding to the opening is changed (shown in fig. 1, item radiation 28 changes the refractive index of exposed area while the unexposed area covered by the mask 18 are not effected) to form a cavity/discontinuity (see at least abstract corresponding to fig. 1 and 3 having cavity/cavities patterns reflecting/resonating light) and , whereby light propagating in the optical fiber after the cavity is formed is reflected at a first end and at a second end of the portion/each-of-the-portions and propagates backward along the optical fiber (shown in at least fig. 1 and 4, item reflected light from the ends of the portion), light reflected at the first end of the/each portion interfering with light reflected from the second end of the/each portion such that changes in a length of the portion result in

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observable changes in an amplitude of such reflected light (shown in at least figures 1 and 5; also col. 5, lines 1-13);

measuring amplitudes of backward-propagating reflection peaks in the fiber at a plurality of times, each of the times corresponding to a location of one of the portions of the cavities (see abstract and col. 5, lines 1-13); forming a first sensor 30 in an optical fiber 10 (see also col. 1, last parag.-col. 2, 1<sup>st</sup> parag.); a plurality of sensors 30 are formed in the optical fiber 10; the plurality of sensors 30 being spaced apart; launching an optical light into the optical fiber, the optical fiber having a plurality of optical sensors 30 formed therein, and

measuring amplitudes of a backward-propagating reflection peaks in the fiber at a plurality of times, each of the times corresponding to a location of one of the plurality of optical sensors (see col. 5, lines 1-13; regarding launching of the optical pulse the arguments presented in rejection of claim 40 above ).

However, Cielo does not specifically state that the above cavity/discontinuity is a fabry-perot cavity and a step of launching an optical pulse into the optical fiber.

Nonetheless, Cielo states that such cavities form resonators (see abstract). It is obvious/well known to those of ordinary skill in the art when the invention was made that cavity/cavities forming reflective resonators are/known as Fabry-Perot cavity or equivalence (see provided definition of Fabry-Perot Cavity) and since such cavities can also be formed by an artisan skilled in the art in extremely conventional Fabry-Perot fibers and it would also have been obvious to a person of ordinary skill in the art when the invention was made to modify launching of light by Cielo into the optical fiber 10

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shown in at least fig. 1, as pulsed since such sending of pulse signal instead of an analog signal is extremely conventional and since such pattern of depth(s)/width(s) would provide tunable distribution feedback reflector made in a length of fiber (see col. 1, 1<sup>st</sup> parag.).

Regarding claims 26-31, Cielo further teaches wherein the exposing step results in a change in a refractive index of the core and/or cladding (see at least abstract); wherein the exposing step is performed using a laser beam (see col. 6, 3<sup>rd</sup> parag.); wherein the fiber is doped with germanium (see col. 1, 2<sup>nd</sup> parag.); wherein exposing step is performed using an energized ion beam (see col. 3, lines 45-62; also col. 1, 2<sup>nd</sup> parag.).

***Previous Citation of Relevant Prior Art***

Prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In accordance with MPEP 707.05 the following references are pertinent in rejection of this application since they provide substantially the same information disclosure as this patent does. These references are:  
The Photonics Dictionary, 1996, D-50 Defines Fabry-Perot Cavity

US 6215927 Singh teaches Fabry-Perot optical fiber

These references are cited herein to show the relevance of the apparatus/methods taught within these references as prior art.

***Response to Arguments and Amendment***

Applicant's argument filed on 1/16/07 have been fully considered but they are not persuasive.

Applicant asserts (page 6-7) that Cielo's does not teach exposing the opening/each-of-the-openings to light/radiation propagation outside the optical fiber

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such that a refractive index of a portion of the fiber corresponding to the opening is changed. The Examiner responds that Cielo teaches exposing the opening/each-of-the-openings 26 to light/radiation propagation outside the optical fiber (shown in fig. 1, item light/radiation 28) such that a refractive index of a portion of the fiber corresponding to the opening is changed (shown in fig. 1, item radiation 28 changes the refractive index of exposed area while the unexposed area covered by the mask 18 are not effected; see col. 3, lines 49-52).

Regarding Applicant's assertion over definition of Fabry-Perot cavity in which "resonator in which feedback is accomplished by two parallel planes" the Examiner refers to Cileo teachings having resonance in between gratings, being parallel in plane, which feedback is accomplished thereon (See at least abstract and col. 1, 1<sup>st</sup> parag.).

***THIS ACTION IS MADE FINAL***

This action in response to applicant's amendment made FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no

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event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

- This application contains claims 32-39 drawn to an invention nonelected with traverse in Paper No. 4. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.
- The examiner kindly advises the applicant to appropriately narrow the scope if the invention in order to allow the case.



**Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Cyrus Kianni whose telephone number is (571) 272-2417.

The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 6:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font, can be reached at (571) 272-2415.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**or faxed to:**

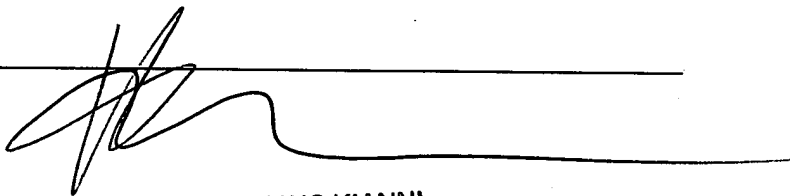
(703) 872-9306 (for formal communications intended for entry)

**or:**

Hand delivered responses should be brought to Crystal Plaza 4, 2021 South Clark Place, Arlington, VA., Fourth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956.

March 28, 2007

A handwritten signature in black ink, consisting of stylized, overlapping loops and a long horizontal stroke extending to the right.

K. CYRUS KIANNI  
PRIMARY PATENT EXAMINER